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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Continuation Application
Under 27 CFR 160
Pending Application of

Morris F. Dilmore et al
Serial No. 10/039,811
Filed: January 8, 2002

**METAL CONSOLIDATION PROCESS
APPLICABLE TO FUNCTIONALLY
GRADIENT MATERIAL (FGM)
COMPOSITIONS OF TANTALUM AND
OTHER MATERIALS**

Art Unit 1742

Pasadena, California
May 27, 2003

AMENDMENT ACCOMPANYING REQUEST FOR
FILING CONTINUATION APPLICATION
UNDER 37 CFR 1.53(d)

Mail Stop CPA
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The following claims are enclosed for
prosecution in this continuation application.

1. The method that includes
 - a) providing particles to be used in

pressure consolidation of a powdered preform,

b) heating said particles,

c) and pressurizing the heated particles to effect said consolidation,

d) said preform consisting essentially of W, Ni, Fe, and Co.

2. The method of claim 1 wherein the Ni, Co and Fe constitute less than 50% of the overall weight of the preform.

3. The method of claim 1 wherein the preform initial powder consists of tungsten particles on which iron, nickel, and cobalt are coated.

4. A metallic body which has been compressed and consolidated from an initial powder metal form to a highly densified form, the body consisting of at least two metals, the proportions of which vary along a body dimension.

5. The body of claim 4 wherein the body consists of four metals.

6. The body of claim 5 wherein said metals include tungsten particles micro encapsulated within layers of cobalt, nickel iron, and nickel, defining a powder A.

7. The body of claim 6 wherein said metals include low alloy steel particles, defining a powder B, and the body includes successive layers, certain layers consisting of mixtures of powder A and powder B wherein the percentage of powder A decreases in said successive layers.

8. The body of claim 4 wherein the body is elongated and has a tapered nose portion, there being a second body portion along said dimension, the body consisting of at least two metals, M_1 and M_2 , the proportions of M_1 and M_2 in said body nose portion and second body portion being different.

9. The body of claim 8 wherein the metal M_1 is tungsten, the proportion of tungsten in said nose portion being greater than the proportion of tungsten in said second body portion.

10. The body of claim 9 wherein the body has third and fourth body portions along said dimension, the proportion of tungsten in said second body portion exceeding the proportion of tungsten in said third body portion, and the proportion of tungsten in said third body portion exceeding the proportion of tungsten in said fourth body portion.


11. The body of claim 4 wherein the body has first and second ends, the consolidated metal at the first end having higher density than the consolidated metal at the second end.

12. The body of claim 11 wherein the metal at the first end consists primarily of tungsten, and the metal at the second end consists primarily of steel.

13. A pressure consolidated powdered metal product wherein the powdered metal is distributed in successive layers, each layer having a different weight percentage of consolidated powdered metals.

Allowance is urged.

Respectfully submitted,



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WWH:ts
Docket 12,516